United States Patent

Sudduth

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[54] **KEYBOARD, DIGITAL CODING, SWITCH FOR DIGITAL LOGIC, AND LOW POWER DETECTOR SWITCHES**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 888,758, Dec. 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 801,438, Feb. 24, 1969, abandoned.

[52] **U.S. Cl.**.....**200/166 C,** 200/159 B, 200/166 PC, 200/166 H, 200/86 R, 200/83 R, 200/5 A

[51] **Int. Cl.**.....**H01h 1/20,** H01n 1/50, H01h 1/04

[58] **Field of Search**.....200/166 C, 166 H, 159 R, 200/159 B, 168 G, 86 R, 166 PC, 5 R, 5 A, 83 R, 83 N; 179/90 K

[56] **References Cited**

UNITED STATES PATENTS

355,858	1/1887	Brainard	200/159 B
2,528,086	10/1950	Schenck	200/166 H
3,054,879	9/1962	Soreng	200/168 G X
3,267,233	8/1966	Basile et al.	200/83 N
3,308,253	3/1967	Krakinowski	200/86 R X
3,359,386	12/1967	Howard	200/83 R
3,382,338	5/1968	Arseneault et al.	200/159 B
3,466,410	9/1969	Jordan et al.	200/83 R
3,056,005	9/1962	Larson	200/86 R
2,843,695	12/1956	Osuch et al.	200/86 R

FOREIGN PATENTS OR APPLICATIONS

18,879	10/1961	Japan	200/166 C
807,883	1/1959	Great Britain	
1,039,150	3/1959	Germany	
1,060,455	7/1959	Germany	

OTHER PUBLICATIONS

Electromechanical Design–" Electromechanical Data–Sampling Switch" November 1962, pages 40, 41.

Flex Key Data Bulletin DK–1 – " Flex Key Integrated Decimal Keyboard Units" Published 1970.

Electronics, " Little Push" Mar. 2, 1970.

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[57] **ABSTRACT**

Electric switches are described in which a resilient, electrically conductive, elastomeric member is spaced adjacent but apart from contact means; among features are the elastomeric connector: of sheet form; on metal contacts as a movable contact bridge; defining a simple and durable multiple switch array including a keyboard, a digital coding assembly and a detector; and as the means, especially with proper selection of distributed conductive particles in the elastomer for limited conductivity, of eliminating the electrical effects of bounce in solid state electronic logic circuitry and the like. Fabrication of the switch as a simple, thin compact laminate using printed circuit boards is shown using the preferred silicone elastomer and carbon filler. In preferred embodiments pressure against conductive elastomer sheet means will cause it to connect to a contact element conductively and release of pressure will cause the sheet means to disconnect. The sheet means can be used as a floating connection for one or more circuit elements, and in this form has particular application in a keyboard assembly, particularly in connection with replaceable printed circuit boards and in digital coding techniques with a single printed circuit board. Preferably, the sheet means resiliently, reversibly deforms from first to second conditions, typically engaging the contacts in the deformed or bulged condition. Preferably in one condition the sheet means takes a planar form, positioned by a spacer layer from the contacts. And preferably the contacts are elements of a printed circuit.

33 Claims, 22 Drawing Figures